REMARKS

Herein, the "Action" or "Office Action" refers to the Office Action dated 6/21/2004.

Applicant respectfully requests reconsideration and allowance of all of the claims of the application. Claims 1-33 and 47-55 are presently pending. Claims amended herein are 1, 9, 18-22, and 28. Claims withdrawn or cancelled herein are none. New claims added herein are 47-55.

Formalities

Information Disclosure Statement

The Office notes that specific references (Japanese patent 11110913 and reference entitled "Robust audio watermarking using perceptual masking" by Swanson et al.) were cited in the submitted IDSs, but did not accompany the IDSs. The Office advises Applicant to submit references to have them considered.

Applicant plans to do just that. A supplemental IDS will be submitted that will include these references.

Abstract

The Office notes that that the abstract is not to exceed 150 words in length. Herein, Applicant amends the abstract to conform.

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Other Informality

The Office notes the text on page 15 needs updating since the referenced U.S. Patent Application has matured into an issued U.S. Patent.

Formal Claim Rejections

Claim Rejections under §101

The Office rejects claims 1-7, 9, and 11-16 under USC § 101, which reads:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The Office indicates that these claims are directed to non-statutory subject matter. Applicant respectfully traverses the rejections of these claims.

The Office explains that the claimed subject matter is "just software alone and of itself." Applicant submits that the subject matter of each of the rejected claims is directed towards a "process" (i.e., a "method"). While computer software may be one way that one may implement the claimed process, the subject matter of each of the rejected claims is directed towards a statutorily allowed process.

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For example, claim 1 below illustrates the subject matter of these rejected claims:

> 1. A method for concealing an information pattern of multiple discrete values within a digital signal, the method comprising:
> receiving the information pattern of multiple discrete values;
> chessboarding the discrete values of the information pattern to produce chessboarded discrete values.

Applicant submits that method claims, like those at issue here, fall within the "process" category of the four enumerated categories of patentable subject matter in §101. Therefore, such method claims are statutory.

Accordingly, Applicant asks the Office to withdraw its rejection of these claims.

Claim Rejections under §112

The Office rejects claims 28-33 as being indefinite. Specifically, the Office indicates that it is unclear which statutory class is claimed. Applicant submits that these claims are a "manufacture" under USC § 101. Sometimes, these are called "product-by-process" claims (see, MPEP 2113). Such a claim is statutory under USC § 101.

Specifically, the "marked signal" of claim 28 is generated as a result of the recited "receiving," "chessboarding," and "encoding" acts. In other

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words, the "marked signal" is a product that is a result of the recited process.

Substantive Claim Rejections

Claim Rejections under §§ 102 & 103

The Office rejects all of the pending claims under §102 and/or §103. For the reasons set forth below, the Office has not shown that cited references anticipate (under §102) the rejected claims. For the reasons set forth below, the Office has not shown made a *prima facia* case showing that the rejected claims are obvious (under §103). Accordingly, Applicant respectfully requests that the rejections be withdrawn and the case be passed along to issuance.

The Office's rejections are based upon the following references:

- **Girod**: *Girod et al.*, US Patent No. 5,809,139 (issued 5,809,139); and/or
- **Wakasu**: *Wakasu*, US Patent No. 6,259,801 (issued 7/10/2004).

Overview of the Application

The Application describes watermarking technology for inserting and detecting watermarks in signals, such as a music clip. The watermark identifies the content producer, providing a signature that is embedded in the audio signal and cannot be removed. The watermark is designed to

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survive all typical kinds of processing, including compression, equalization, D/A and A/D conversion, recording on analog tape, and so forth. It is also designed to survive malicious attacks that attempt to remove or modify the watermark from the signal, including changes in time and frequency scales, pitch shifting, and cut/paste editing.

In one described implementation, a watermarking system employs chess spread-spectrum sequences (i.e., "chess watermarks") to improve the balance of positive and negative chips in the watermarking sequences. The balance is not imposed in an orderly fashion, which might make the watermark sequence more easily detectable to an attacker, but in a pseudo-random fashion. In that way, better sequence balance is achieved while preserving its randomness for an attacker without knowledge of the keys.

In another described implementation, a watermarking system employs an energy-level trigger to determine whether to skip encoding of a portion of a watermark within a given time span of an audio clip. If a large discrepancy in energy levels exists over a given time frame, then the frame is not watermarked, to avoid audible time-dispersion of artifacts due to spectral modifications (which are similar to "pre-echo" effects in audio coding). In another described implementation, a watermarking system begins encoding of a watermark at a variable position after the beginning of an audio clip.

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Cited References

The Office cites **Girod** as its primary references in its anticipation- and obviousness-based rejections. The Office cites **Wakasu** as its secondary reference in its obviousness-based rejection.

Girod

Girod describes a technology for digital watermarking that allows for the watermarking of a digital video signal in a compressed form, thereby allowing watermarking of a pre-compressed video sequence without requiring the decoding and re-coding of the signal.

The watermark signal is a sequence of information bits which has been modulated by a pseudo-random noise sequence to spread it in the frequency domain. The video signal is transform coded, preferably with a discrete cosine transform, and a watermark signal, which has been transform coded using the same type of transform, is added to the coded video signal.

The system also includes bitstream control to prevent an increase in the bit rate of the video signal. This allows the system to be used with transmission channels having strict bit rate constraints. For each transform coefficient of the video signal, the number of bits necessary to encode the watermarked coefficient is compared to the number of bits necessary to encode the unwatermarked coefficient.

If more bits are required to transmit a watermarked coefficient than to transmit the corresponding unwatermarked coefficient, the watermarked

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coefficient is not output, and the unwatermarked coefficient is output in its place. When watermarking interframe coded data, a drift compensation signal may be used to compensate for the accumulating variations in the decoded video signal stored at the receiver. The system may also include an encryption/decryption capability, with the watermarking apparatus located at either the transmitting or receiving end of the transmission channel.

Wakasu

Wakasu describes a technology for providing an electronic watermark data inserter and detector where, even when plural electronic watermark data are inserted into an image, the electronic watermark data can be inserted without negation each other, and at the time of detection, the electronic watermark data can be detected properly.

In **Wakasu's** method for inserting identification data (electronic watermark data) according to the present invention, an image is frequency-transformed for each block of j×k pixels (where j and k are natural numbers), and when the electronic watermark data are inserted into the frequency components transformed, the electronic watermark data are inserted for each block after the kinds of the electronic watermark data to be inserted are changed, so that the electronic watermark data are inserted without negation each other and detected for each block.

More particularly, an electronic watermark insertion position table is provided indicating which kind of electronic watermark data is inserted into which block in an image, and an applicable electronic watermark data is

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inserted into the area which is shown in the insertion area table. When the electronic watermark data is detected, the electronic watermark extraction position table similar to that when inserted is used to detect the electronic watermark data.

In **Wakasu**, when a plurality of electronic watermark data are inserted into an image, different electronic watermark data are inserted into for each block, so that the electronic watermark data can be inserted without interference of the different electronic watermark data and negation each other, and also the electronic watermark data can be detected properly even when a plurality of electronic watermark data are embedded.

Anticipation Rejections

Based upon Girod

The Office rejects claims 1-3, 5-12, 14-23, 25-29 and 31-33 under USC § 102(a) as being anticipated by **Girod**. Applicant respectfully traverses the rejections of these claims. Based on the reasons given below, Applicant asks the Office to withdraw its rejection of these claims.

Claim 1

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receiving the information pattern of multiple discrete values;**

  [col. 3, lines 7-10 and col. 4, lines 11-19]

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- **chessboarding the discrete values of the information pattern to produce chessboarded discrete values, wherein chessboarding comprises adjusting one or more discrete values of the information pattern.** ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48)."]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding" recited in this claim.

Although **Girod** does not elaborate on the meaning of "zig-zag scanning," it is a familiar term to those skilled in the art of digital imaging and video.

The purpose of zig-zag scanning is based upon the observation that most of the high frequency DCT coefficients are zero after quantization. Prior to encoding, the two-dimensional array of coefficients is transformed to a one-dimensional array by zig-zag-scanning (see Fig. A below).

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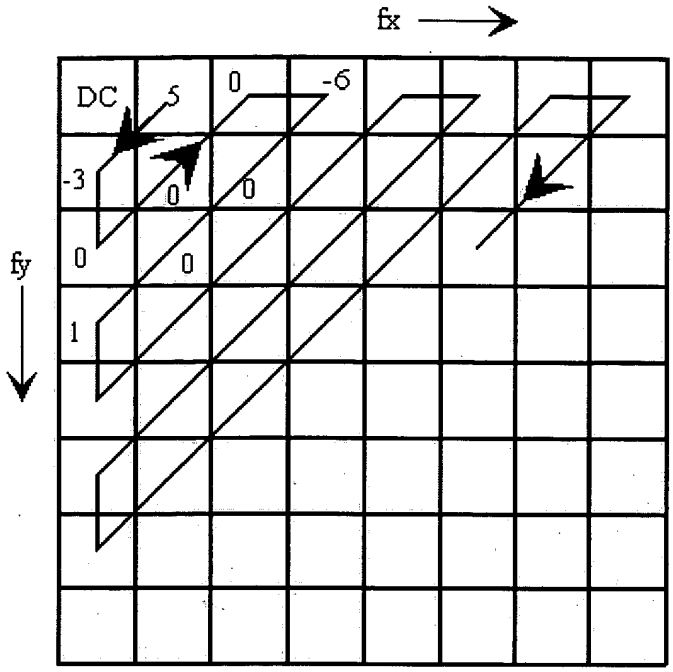

Fig. A

From http://www.bretl.com/mpeghtml/zigzag.HTM, we get the following definition of "zig-zag scanning:"

Zig-Zag Scanning Patterns

The zig-zag scanning pattern for run-length coding of the quantized DCT coefficients was established in the original MPEG standard. The same pattern is used for luminance and for chrominance. A modified (alternate) pattern more suitable for coding of some interlaced picture blocks was added in the MPEG-2 standard. A bit in the picture layer header, if set, selects the alternate scan.

The patterns are represented below, in which the upper left corner is the DC term.

zig-zag scan order:

```
0   1   5   6  14  15  27  28
2   4   7  13  16  26  29  42
3   8  12  17  25  30  41  43
9  11  18  24  31  40  44  53
10  19  23  32  39  45  52  54
```

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```
20  22  33  38  46  51  55  60
21  34  37  47  50  56  59  61
35  36  48  49  57  58  62  63
```

alternate scan order:

```
0   4   6  20  22  36  38  52
1   5   7  21  23  37  39  53
2   8  19  24  34  40  50  54
3   9  18  25  35  41  51  55
10  17  26  30  42  46  56  60
11  16  27  31  43  47  57  61
12  15  28  32  44  48  58  62
13  14  29  33  45  49  59  63
```

From the above descriptions, it appears that "zig-zag scanning" involves the re-arrangement of a 2-dimentional matrix into a 1-dimentional array using a defined "zig-zag" pattern.

However, "chessboarding" is not simply a re-arrangement of values in a sequence. Instead, it involves and active adjusting of the discrete values in a pattern. That pattern by be predefined (as in the case of "absolute" chessboarding) or pseudorandomly generated.

In addition to other places, the Application discusses, on page 29, lines 13-16, the terminology of "chessboarding":

> A watermark that results from chessboarding may be called a "chess watermark" because it appears to be a chessboard if graphed two-dimensionally. Likewise, the act of processing a

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watermark in this fashion may be called "chess watermarking" or "chessboarding."

Therefore, Applicant submits that **Girod** does not disclose "chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claims 2-8

These claims ultimately depend upon independent claim 1. As discussed above, claim 1 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claim 9

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receiving the information pattern of multiple chessboarded discrete values;** [col. 3, lines 7-10 and col. 4, lines 11-19]
- **un-chessboarding the chessboarded discrete values to produce the original values of the information pattern, wherein un-chessboarding comprises adjusting one or more**

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chessboarded discrete values of the information pattern. ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48) The transform (chessboarded) data is then decoded (un-chessboarded) to retrieve the original discrete values of the information pattern (col. 4, lines 11-33)."]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Thus, the Office interprets "de-zig-zag scanning" to be the same as "un-chessboarding." Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding" and thus "de-zig-zag" scanning is different then un-chessboarding.

The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "un-chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

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Claims 10-17

These claims ultimately depend upon independent claim 9. As discussed above, claim 9 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claim 18

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receiving the information pattern of multiple discrete values;** [col. 3, lines 7-10 and col. 4, lines 11-19]
- **chessboarding the discrete values of the information pattern to produce chessboarded discrete values, wherein chessboarding comprises adjusting one or more discrete values of the information pattern;** ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48)."]
- **encoding the chessboarded discrete values into the digital signal, wherein such signal is noise in relation to the information pattern.** ["Girod et al additionally teaches of encoding the chessboarded, discrete values into a digital signal, where in the signal is noise in

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relation to the information pattern (col. 1, lines 64-66, col. 2, lines 10-17, and col. 6, lines 24-26)."]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding."

The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 19

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receiving the information pattern of multiple chessboarded discrete values;** [col. 3, lines 7-10 and col. 4, lines 11-19]
- **un-chessboarding the chessboarded discrete values to produce the original values of the information pattern, wherein un-chessboarding comprises adjusting one or more**

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chessboarded discrete values of the information pattern; ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48) The transform (chessboarded) data is then decoded (un-chessboarded) to retrieve the original discrete values of the information pattern (col. 4, lines 11-33).]

- **detecting the original discrete values encoded in the digital signal, wherein such signal is noise in relation to the information pattern.** ["Girod et al additionally teaches of encoding the chessboarded, discrete values into a digital signal, where in the signal is noise in relation to the information pattern (col. 1, lines 64-66, col. 2, lines 10-17, and col. 6, lines 24-26). The transform (chessboarded) data is then decoded (un-chessboarded) to retrieve the original discrete values of the information pattern (col. 4, lines 11-33 and col. 5, lines 4-8)."]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Thus, the Office interprets "de-zig-zag scanning" to be the same as "un-chessboarding." Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding" and thus "de-zig-zag" scanning is different then un-chessboarding.

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The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "un-chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 20

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receive an information pattern of multiple discrete values;** [col. 3, lines 7-10 and col. 4, lines 11-19]
- **chessboard the discrete values of the information pattern to produce chessboarded discrete values, wherein one or more of the chessboarded discrete values differs from the discrete values before chessboarding.** ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48)."]

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The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding."

The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claim 21

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receive the information pattern of multiple chessboarded discrete values;** [col. 3, lines 7-10 and col. 4, lines 11-19]
- **un-chessboard the chessboarded discrete values to produce the original values of the information pattern, wherein one or more of the un-chessboarded discrete values differs from the chessboarded discrete values before un-chessboarding.** ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents

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chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48) The transform (chessboarded) data is then decoded (un-chessboarded) to retrieve the original discrete values of the information pattern (col. 4, lines 11-33).]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Thus, the Office interprets "de-zig-zag scanning" to be the same as "un-chessboarding." Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding" and thus "de-zig-zag" scanning is different then un-chessboarding.

The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "un-chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

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Claim 22

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **a receiver for receiving the information pattern of multiple discrete values and the digital signal;** [col. 3, lines 7-10 and col. 4, lines 11-19]
- **a chessboarder coupled to such receiver, the chessboarder chessboards the discrete values received from the receiver to produce chessboarded discrete values, wherein one or more of the chessboarded discrete values differs from the discrete values before chessboarding;** ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48)."]
- **an encoder coupled to the receiver and the chessboarder, the encoder inserts the chessboarded discrete values received from the chessboarder into the digital signal received from the receiver.** ["Girod et al additionally teaches of encoding the chessboarded, discrete values into a digital signal, where in the signal is noise in relation to the information pattern (col. 1, lines 64-66, col. 2, lines 10-17, and col. 6, lines 24-26)."]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Applicant disagrees.

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Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding."

The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "chessboarding," as recited in the claim.

As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claims 23-27

These claims ultimately depend upon independent claim 22. As discussed above, claim 22 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Claim 28

With the cited portions of **Girod** and the Office's comments provided in brackets, this claim recites:

- **receiving the information pattern of multiple discrete values;**

  [col. 3, lines 7-10 and col. 4, lines 11-19]

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- **chessboarding the discrete values of the information pattern to produce chessboarded discrete values, , wherein one or more of the chessboarded discrete values differs from the discrete values before chessboarding;** ["The discrete values are placed through a DCT element to produce a transform (col. 4, lines 11-19). It is interpreted by the examiner that this transform represents chessboarded, discrete values since it is disclosed by Girod et al that entropy encoding includes zig-zag scanning of the quantized coefficients to convert 8x8 blocks to a 1x64 vector (col. 5, lines 44-48)."]
- **encoding the chessboarded discrete values into the digital signal, wherein such signal is noise in relation to the information pattern.** ["Girod et al additionally teaches of encoding the chessboarded, discrete values into a digital signal, where in the signal is noise in relation to the information pattern (col. 1, lines 64-66, col. 2, lines 10-17, and col. 6, lines 24-26)."]

The Office interprets the "zig-zag scanning" of **Girod** to be equivalent to "chessboarding" of this claim. Applicant disagrees. Applicant submits that the "zig-zag scanning" of **Girod** is different than the "chessboarding."

The basis of the reason is the same given above in claim one as to why "zig-zag scanning" and "chessboarding" differ. That reasoning applies here as well.

Therefore, Applicant submits that **Girod** does not disclose "chessboarding," as recited in the claim.

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As shown above, **Girod** does not disclose all of the claimed elements and features of the claim. Accordingly, Applicant asks the Office to withdraw its rejection of this claim.

Claims 29-33

These claims ultimately depend upon independent claim 28. As discussed above, claim 28 is allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Obviousness Rejections

Lack of *Prima Facie* Case of Obviousness (MPEP § 2142)

Applicant disagrees with the Office's obviousness rejections. Arguments presented herein point to various aspects of the record to demonstrate that all of the criteria set forth for making a *prima facie* case have not been met.

Based upon Girod and Wakasu

The Office rejects 4, 13, 24, and 30 under USC § 103(a) as being unpatentable over **Girod** as modified by **Wakasu**. Applicant respectfully

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traverses the rejections of these claims. Applicant asks the Office to withdraw its rejection of these claims.

These claims ultimately depend upon independent claims 1, 9, 22, and/or 28. As discussed above, these claims are allowable.

In addition to its own merits, each of these dependent claims is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each of these dependent claims because its base claim is allowable.

Dependent Claims

In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

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Conclusion

All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

Dated: 9-30-04

By: _____

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